Teaching and assessment strategies in a Practice-based teacher education program. Instrument validation*

Kiomi Matsumoto-Royo †
Facultad de Educación
Universidad del Desarrollo
Santiago Chile
kmr@usal.es

María Soledad Ramírez-Montoya
Departamento de Educación
Tecnologico de Monterrey
Monterrey México
solramirez@tec.mx

ABSTRACT

The challenge of transforming a teacher education program into a practice-based teacher education program involves relevant innovations. Especially innovations regarding the type of teaching and assessment strategies that are developed in courses taught within those on-campus programs. For this reason, after the first years of implementation of the practice-based approach, it is relevant to measure whether the lesson plans that the Teacher Educators (TEs) carry out consider teaching and assessment strategies that promote an approximation to pedagogical practice in Pre-Service Teachers (PSTs). This study aims to present the validation of an instrument designed to collect information on the type of teaching and assessment activities planned by TEs in on-campus courses. The methodology consisted of two rounds of the Delphi method. The results show the validation of the instrument, constituting therefore a valid tool for the collection of integrated information on both dimensions. The validated instrument is useful for Practice-Based Teacher Education (PBTE) programs to relate the activities that their TEs plan to the guidelines of this approach. Thus monitoring the scope of the innovation, they are developing.

CCS CONCEPTS

• Social and professional topics • User characteristics • Cultural characteristics

KEYWORDS

Teacher education, Practice-based, Teaching activities, Assessment, Delphi method, Instrument, Validation.

1. Context and motivation that drives the dissertation research

Several programs have begun a transformation in recent years, in the search to improve the quality of teacher education. Some of them have focused more intensely on helping Pre-Service Teachers (PSTs) learn how to enact teaching practices that will enable those teachers to promote student learning [1]. This focus has been given as there is evidence that teacher education that focuses more on the work of the classroom and provides opportunities for teachers to study what they will be doing as teachers seem to produce teachers who, on average, are more effective during their 1st year of teaching [2]. Practice-Based Teacher Education (PBTE) is currently a subject of high interest among researchers in the area of teacher education with many opportunities to continue developing [3]. Given the novelty of this pedagogy of teacher training, it becomes necessary to undertake major revisions to teacher education to accommodate it [4]. In this sense, it is essential to monitor the scope and depth of the implementation of the teaching of practices because, although there is guidance on pedagogy, there is little evidence of its implementation.

An area of PBTE that has seen very limited investigation is the adjustments that TEs have been making to their teaching. This change to core practices not only contributes to the learning of PSTs but also to that of those who teach them [5] because an educational innovation involves changes in various actors, including teachers [6]. Teacher educators (TEs) are seeking to develop strategies for assessing the results of their effort [7] They could use PBTE as a framework to reflect on their instruction and adapt assignments to better support candidates' needs [8]. In this regard, the field needs a much clearer understanding of how TEs are defining and applying the fundamental ideas of basic practices in teacher education contexts [9]. One way to access the adjustments that TEs have been making would be from the lesson plans that they develop to address teaching in a course. In some countries and institutions, they call this a syllabus or class-to-class plan. The syllabus, unlike the course program which is general and prescriptive, has a more specific and descriptive component. The review of the syllabus offers a non-invasive alternative, possibly to be developed by any education program, that allows us to obtain relevant information about the teaching and assessment strategies that the TEs are planning. The program's document analysis counteracts some of the problems with self-

reported data [10] and, additionally, allows for internal evaluation processes [11] whit more accurate information on what is taught [2]. Syllabi reviews, when reviewed systematically and coded consistently, present reviewers and Higher Education Institutions with opportunities to learn. In teacher education programs, in particular, the results can be used to revamp courses and improve instruction [12]. In this way, the results of a process of this nature would allow us to identify the stage at which the implementation of the practice-based approach is found. On the one hand, it would make it possible to know in which courses practice teaching activities are being planned and which are the most planned. On the other hand, it would make it possible to identify the variety of assessment strategies planned and their relevance to practice learning experiences, an area that requires empirical evidence to generate a more complete picture of the PST's training [3]. Even in those programs that have not declared a practice-based approach, the application of an instrument of this nature makes it possible to verify whether the teaching of teaching practices is present in the teacher education program.

Therefore, given that for PBTE there is currently no instrument that allows for the revision of lesson plans in terms of opportunities to approach pedagogical practice from the point of view of teaching and assessment strategies, the design and validation of this instrument is very relevant, this is because various teacher education programs, stakeholders and those TEs who have initiated adjustments in their teaching, can count on the instrument.

2. State of the art

2.1 Practice-based Teacher Education

In the last decade, various countries have initiated important transformations in teacher education. According to a comparative study of teacher education in developed countries with well-established systems, teacher education programs are attempting to make a greater connection between theory and practice through the design of reflective work and the integration of high-quality clinical work [13]. In the case of Spain, a new model of initial teacher education gives considerable importance to the practical formation. They consider teacher training as a true formative process, which requires time in order to incorporate all the knowledge and skills that require reflection based on practical experience [14]. In Latin America, there are trends in which practice permeates the entire period of initial training, not only at the end of studies, and there is also a greater diversity of practice in terms of complexity [15]. Cox [16] points out that for a quarter of a century, teachers have been educated in a highly theoretical way, which makes it demanding and new today, the fact that these professionals need to be trained in practical performance skills and to put skills into practice, in other words, a shift towards training teachers through practice. Therefore, practice-based teaching offers a response to the concern for having highly prepared teachers to educate the new generations.

PBTE involves elevating the practice of teaching to a level of importance it did not have before. The practice must be at the heart of teacher education [17]. This has resulted in the explicit teaching of "core practices" [18] which consists of putting knowledge, beliefs, and dispositions into action, through strategies, routines, and movements that can be decomposed and learned by PSTs [19]. The focus must be placed on these practices. The core practices are generally specified to students from the outset of a program or course and form the core of assignments or even program completion requirements [20]. It is therefore hoped that from a practice-based curriculum, PSTs will not only have the necessary knowledge but will also be able to support their future students' learning by putting this knowledge into action through concrete strategies and routines from the outset.

In a PBTE the university courses are adjusted considering two critical aspects to improve teacher training, namely reorienting methods courses towards teaching practices and ways to support the transfer of conceptual understandings about teaching in daily life in the classrooms. Both are critical aspects to improve teacher training [21]. Teaching methodologies include the segmentation of pedagogical practices, their representation from videos or other models, the incorporation of spaces for simulations or rehearsal, which seem to work as a bridge between teaching methodology courses and the practice of teaching in classrooms [22]. Thus, the adoption of PBTE implies that TEs must adjust teaching methodologies and reorient assessment processes in terms of methods, procedures, and instruments that are coherent with the new teacher training approach.

2.2 Opportunities for the teaching of practices and Pre-Service Teachers (PSTs) assessments in teacher education programs

A practice-based teacher education program is characterized by offering those in training a variety of opportunities to learn the practice of the courses being taught on-campus. Along this line, Hammerness & Klette [23] developed a set of indicators of opportunities for PSTs to learn teaching practices, a framework that has been considered in several studies [24, 26]. Jenset, Flette y Hammerness [27] sought to capture what could be universal representations of teaching practice, not referring to one country, but relevant to several countries, and developed indicators to identify how PSTs learn pedagogical practice in the courses of a teacher education program of this nature. These activities are concerned with PSTs who can:

- ✓ plan classes, class segments and/or class sequence according to a structure, and record their planning in writing,
- ✓ simulate the role of the teacher and the implementation of teaching segments, through rehearsals or micro-teaching through role-play,
- ✓ analyze physical and audio-visual evidence of young children's learning, such as handouts, test answers, table with results, class transcripts, dialogue records, class videos, class records, among others,
- ✓ use, analyze and/or discuss teaching resources used in real teaching contexts, such as study texts (pages), work guides, tasks, objects that are used with the intention of

teaching, didactic games, stories or evaluation instruments,

✓ comment, analyze and/or discuss the experiences that take place, that they observe or experience in real teaching contexts such as schools, high schools or kindergartens,

✓ consider the perspective of children-youth in the classroom by analyzing their experiences from videos, photographs, or written records or by carrying out the activities that the children-youth would carry out in the classroom,

✓ observe core practices on videos or from the modeling done by the teacher-trainer or the peers, discussing their components,

✓ read and/or analyze national curriculum references for school and pre-school education, such as national curricula, study programs, and frameworks for good teaching.

If the training program offers activities in which the PSTs have opportunities to learn how to enact teaching practices in on-campus courses, the assessment of the learning of PSTs must be pertinent to how they learned. The design and implementation of assessment activities by TEs should enable information to be collected on the learning of PSTs in a teacher education program [28]. PSTs are expected to demonstrate performances associated with the way teaching practice activities were learned and to relate them to authentic or near-authentic tasks performed by a teacher [29, 30]. Besides, in the case of evaluations that seek to evidence performance, it is necessary to have evaluation criteria that guide the expected performance [31, 32], which include high levels of feedback [33] provided during their application or once they have been applied [34]. Finally, performance can be evidenced in "deliverable" type tasks (delivered in digital or printed formats) or "executable" type tasks (performed in person) [35]. All of the above are characteristics associated with assessment for those who are prepared as teachers in PBTE.

Given the novelty of PBTE approach, few instruments seek to collect information on teaching practice opportunities that a teacher education program offers its students. In this regard, in Table 1 we refer to the main instruments of the Coherence and Assignment Study in Teacher Education project (CATE) [36] aimed at creating a deeper understanding of pedagogical practices in teacher education in different contexts, in particular, those practices in teacher education instruction that effectively link theory and practice.

In table 1, we also refer to some of the instruments used in the Teacher Policy Research (TPR) [37] that examines the behavior of teachers and administrators when developing policies that will attract and retain high-quality teachers and leaders, especially in low-performing schools. The Teacher Policy Research covers a broad range of issues in teacher policy, including teacher preparation, teacher labor market institutions, how teachers are distributed across schools, and teacher retention, particularly in urban, low performing schools. Finally, we also refer to an instrument that takes the CATE survey as a basis, adapting it in some aspects.

Table 1
Instruments

Reference	Instrument	Type	Dimensions
[38]	Teacher education	Survey	Perceived coherence between courses. Opportunities to connect parts of the program. Perceived coherence between field experiences and courses
[39]	The Rubric for dimensions of Theory and Practice in Teacher Education [DPO]	Observation Protocol	Opportunities to plan for teaching & teacher role[s]. Opportunities to practice or rehearse teacher role[s]. Opportunities to analyze pupil learning. Opportunities to include Teaching Materials, Artifacts, and Resources. Opportunities to talk about Field Placement/Student Teaching Experiences. Opportunities to take a pupil's perspective. Opportunities to see models of teaching. Opportunities to see the connection to National, State or Local Context or Curriculum
[10]	Teacher Preparation Program Graduates, section C: Program Characteristics	Survey	Program Mission and coherence. Program Faculty. Preparation for Learners. Field Experiences
[10]	Teachers in First Year of Teaching, School Year 2004-2005. Section A Teacher preparation	Survey	Program coherence and Program Faculty. Preparation for Learners. Field Experiences
[24]	Perception Questionnaire of students regarding their learning opportunities.	Likert scale [in part one]. Closed questions and selection items [in part two].	Student perceived learning opportunities: coherence. Student perceived learning opportunities: generative practices

2.3 Instrument to validate

Following an extensive literature review that considered on-campus activities which aimed at bringing PSTs closer to the practice of teaching [23, 27, 18, 25, 40] and characteristics of the assessment processes associated with them [29, 30, 32, 41, 33, 34], the last instrument in table 1, Teaching and Assessment strategies for Pedagogical Practice (TAPEP), was designed. The instrument aims to collect information on teaching activities and strategies that offer opportunities to approach pedagogical practice and that are planned for the didactics and practice courses taught in PBTE programes. The instrument is a checklist that records the occurrence of different reagents. The presence or absence of these is noted, thus recording their appearance and frequency [42]. It is

structured in two dimensions, with reagents and sub-reagents (reactives), the presence or absence of which must be evaluated in each weekly lesson plan associated with a subject. Table 2 presents the dimensions of the instrument, the indicators and the associated reagents.

Table 2
Dimensions and Indicators

Variable	Dimensions	Indicators	Reagents
Teaching and assessment strategies for pedagogical practice	Opportunities for an approach to pedagogical practice in the teaching of the programe's courses	Opportunities to observe core practices in videos or modeling	1, 2
		Opportunities to analyze national curriculum references	3
		Opportunities to analyze evidence of children's learning	4,5
		Opportunities to analyze authentic teaching resources	6
		Opportunities to discuss field experiences	7
		Opportunities to consider the perspective of the learners	8, 9
		Opportunities to simulate the teacher's role in teaching segments	10
		Opportunities for lesson planning	11, 12
	Opportunities for an approach to pedagogical practice in the assessment of the programe's courses	Related to teaching practice activities	13
		Authentic Teacher's Tasks	20, 21 and it is sub-reagents
		Clear instructions	14, 15, 16, 17, 18, 19
		Explicit evaluation criteria	22 and it is sub-reagents
		Feedback during or after application	23 and it is sub-reagents

The instrument allows for the collection of information from the review of weekly class plans, a document that in some education faculties is mandatory, and considers the planning of each of the classes that will take place during the semester or academic period. Generally, the components of a syllabus are learning objectives (or learning outcomes), core activities, assessment activities and the associated literature.

3. Research objectives/goals

Given the growing interest in practical preparation of PSTs and the benefits that this type of training can bring to the educational area, the objective of the present work is to design and validate through expert judgment the content of the instrument Teaching and Assessment strategies for Pedagogical Practice (TAPEP). TAPEP allows for a systematic collection of information on the teaching and assessment strategies that teacher educators declare in their lesson plans.

4. Methods

Research design

For the validation of the content of this instrument, the Delphi method [43] was chosen because it allows the structuring of a communicative process of various experts. The discussion of the experts is organized in a group-panel to bring light to a research problem, establishing an iterative process through feedback and orienting itself towards a statistical measurement of the group response [44]. In this case, the aim was to have an instrument that was valid in terms of its content, i.e. that the instrument measured what it was intended to measure.

For the review process by the panel of experts, two stages or rounds were established. Round 1 consisted of three tasks: (1) answer a form referring to professional variables; (2) evaluate on a scale of 1 to 4 the reagents that make up the initial proposal of the instrument according to 4 criteria: Clarity (the reactive is understood, it is written correctly), Coherence (the reactive is related to the dimension or indicator that it measures), Relevance (the reactive is important and must be included) and Sufficiency (the reactive belonging to the same dimension is sufficient to measure it); (3) make suggestions regarding the reactive. After round 1, the answers were categorized and ordered according to the degree of agreement. The result of this process was the starting point for further opinions [45]. Next, round 2 consisted of assessing the clarity, coherence, relevance, and sufficiency of the reformulated and new reagents obtained as a result of round 1. The procedure described in task 2 of round 1 was used again.

Population and sample

In this method, the quality of the process and its results are largely conditioned by the composition of the group of experts, so inclusion criteria were established such as postgraduate studies (master's or doctorate), academic expertise or experience in teacher training (at least 5 years) and academic expertise or experience in the design of curricular instruments (at least 5 years). Regarding the number of experts, although this method does not specify rules regarding the number of participants [46], in this study it was decided to form a panel of 8 experts, as it was considered a sufficient number to have a diversity of views represented.

Variable studied

The variable that the instrument measures are Teaching and Assessment Strategies for Pedagogical Practice. That variable is defined as teaching-learning and assessment strategies that

provide PSTs with opportunities to learn about pedagogical practice in classes that are held on campus as part of a teacher education program. The variable is divided into two dimensions: (1) Opportunities for an approach to pedagogical practice in the teaching of the courses of the program; (2) Opportunities for an approach to pedagogical practice in the assessment of the courses of the program.

Type of Instrument

A questionnaire was designed for round 1, for the experts to review the reagents. The questionnaire considered an introduction in which the purpose of the review, the characteristics of the instrument and the stages of the process (rounds and tasks associated with each one) were presented. Then, the questionnaire asked the experts for personal information regarding their studies, experience, and fields of expertise. Specific instructions for the review were then given. The questionnaire was created and applied online, thus reducing time delays and optimizing resources. Each member of the expert panel conducted an individual evaluation, which was completed within 10 days for the first round and 14 days for the second round.

The review was carried out based on open and closed questions. According to Reguant Álvarez [45] open and/or closed questions can be used, but as the process of assessing the reagents advances, rating scale close-ended questions and ordering close-ended questions tend to increase, allowing the level of agreement/disagreement of the experts to be displayed, the dispersion of opinions to be reduced and the consensus average on the premises extracted to be specified. In this study, closed and open questions were chosen. The closed questions were answered using a reagent evaluation rubric (Figure 1) based on the proposal by García et al. [47], which presented the four criteria evaluated (clarity, consistency, relevance, and sufficiency), based on a four-level rating scale and descriptors associated with each criterion and level. The open-ended questions contained specific observations for each reagent. The matrix of the contents of the instrument and the complete instrument was also attached.

For the second round, a very similar questionnaire was used. This second questionnaire did not include the personal information section. The content matrix was adjusted and only presented the modified reagents.

Rating scale / Criteria	1. Does not meet the criteria	2. Low level	3. Moderate level	4. High level
Clarity The reagent is understood, it is written correctly.	The reagent is not clear, it is not understood.	The reagent requires major modifications to make it clear.	The reagent requires a minor modification to make it clear.	The reagent is clear, easily understood.
Coherence The reagent is related to the dimension or indicator it measures.	The reagent is not related to the dimension.	The reagent has a low dimensional relationship.	The reagent has a moderate relationship with the dimension.	The reagent is highly dimensional.
Relevance The reagent is important	The reagent can be removed without	The reagent is of little relevance.	The reagent is of moderate relevance.	The reagent is very relevant and
and must be included.	affecting the dimension measurement.			should be included.
Sufficiency Reagents belonging to the same dimension are sufficient to measure it.	The reagents are not sufficient to measure the dimension.	The reagents measure some aspect of the dimension but do not cover it.	One or two reagents should be added to measure the dimension.	The reagents are sufficient to measure the dimension.

Figure 1: Evaluation rubric

Information collection and analysis

The following methods were used to analyze the data obtained. For the quantitative analysis in round 1, the mean of the experts' assessment of the reagents in terms of their clarity, coherence, and relevance; and the sufficiency of the set of reagents concerning each dimension were calculated and analyzed. A weighting of 20% was assigned to the Clarity criterion, 30% to the Coherence criterion, and 50% to the Relevance criterion. The criterion used to judge the reagents as valid was the following: 1) to present a mean of more than 3 and a standard deviation less than or equal to 1.5, and 2) to present ratings of 3 or 4 in at least 80% of the responses. Next, for round 2 the congruence between evaluators was established based on statistical analysis using Kendall's W concordance coefficient. This coefficient allows measuring the degree of agreement between several ranges of n number of objects or individuals and is useful when experts are asked to assign ranges to the reagents (ordinal scale).

Regarding qualitative information, an analysis of the content of the observations and suggestions made by the panel was carried out. In order to analyze the observations' content, the following order criteria were established: first, review the observations that correspond to the dimensions of the instrument's content matrix. Then, review the set of observations associated with the reagents of the same dimension, including those to the corresponding sub-reagents and starting with those that did not meet the criteria of the quantitative analysis. Thirdly, review the observations of each expert on the different reagents.

For the adjustment of the reagents, the following criteria were established: a. consideration of the observations of those reagents that did not meet the quantitative criteria; b. the coincidence of observations or recommendations of two or more judges; c. consideration of the observations of those reagents that exceeded the quantitative criteria but presented lower values in the averages and higher values in standard deviation; d. consideration of observations that implied an improvement in the reagent.

5. Results

The results of round 1 indicated that all the reagents met the previously established criteria (mean of more than 3, deviation of less than 1.5 and 80% of judges scored 3 or 4 on each criterion) so the decision was made to keep them. Also, the analysis of the content of the observations made it possible to revise the wording of each reagent and to modify some verbs, concepts, connectors, and examples in several of them.

In line with the previous results, the instrument was adjusted and presented again to the panel of experts for the second round. This round was also conducted using an online form which facilitated the management of the process. In this opportunity, they were told about the results of round 1, in which all the reagents had exceeded the percentage of the agreement established for each criterion (clarity, consistency, relevance, and sufficiency), the non-elimination of any reagent and the modifications to reagents and sub reagents. The results of round 2 consider the judges' ratings of the reagents that were modified. Table 3 presents the results of both rounds.

Table 3
Results of round 1 and round 2

	Reagent	Round 1		Round 2	
		Average	Standard deviation	Average	Standard deviation
Dimension 1	1	3.8	0.6	3.9	0.3
	2	3.6	0.6	4	0.3
	3	3.7	0.8	4	0.3
	4	3.9	0.8	4	0.3
	5	3.8	0.6	4	0.3
	6	3.8	0.7	3.9	0.3
	7	3.6	0.8	3.9	0.2
	8	3.5	1.1	3.8	0.4
	9	3.8	0.4		
	10	4	0.7	4	0.3
	11	3.9	0.8		
	12	3.8	0.2		
	Sufficiency	3.9	0.4	3.9	0.4
Dimension 2	13	3.5	0.7	3.8	0.4
	14	3.6	0.8	3.9	0.4
	15	3.9	0.7	4	0.3
	16	3.9	0.7		
	17	3.6	0.7		
	18	3.7	0.6		
	19	3.8	0.8		
	20	3.9	0.7		
	21	4	0.7		
	22	3.8	1		
	23	3.7	1		
	Sufficiency	3	0.8	3.6	0.5

The results of round 2 were also statistically analyzed using Kendall's W concordance coefficient. In this study, its value corresponds to the degree of agreement among the evaluators. The statistic calculated with SPSS software (v.20) showed a significance of 0.008, so it was concluded that there was significant agreement between the ranges assigned by the experts. The strength of this concordance is 0.206. Besides, all the reagents met the established validity criteria (mean of more than 3, deviation of less than 1.5 and 80% of judges scored 3 or 4 on each criterion) so the decision was made to maintain them. Also, the analysis of the content of the observations allowed minor adjustments to be made in the wording of reagents 1, 3, 4, 5, 6, 7, 8, 10, 13, and 14.

6. Discussion

For the process of validating an instrument, the Delphi method offers the possibility of having not only the valuable opinions of a panel of experts but also to achieve consensus in their assessments, based on repeated rounds. The results indicate that although the panel was made up of eight people with a diversity of expertise and experience, the results show a higher assessment of the reagents in the second round and signed agreement between the ranges assigned by the experts. In this way, the method made it possible to structure a communicative process of various experts organized in a group-panel, establishing an iterative process through feedback and orienting itself towards a statistical measurement of the group response [40]. This panel of experts offers greater consistency in the validation of the instrument given the agreement they reach in a second review.

In a process of expert validation in two rounds, the process of quantitative and qualitative analysis that is carried out after the first round and concludes with the adjustment to the reagents is very relevant. When reviewing the results, we can observe a significant increase in the values assigned by the experts to the different reagents between round 1 and round 2. Several of them scored highest in the second round, and there was a clear decrease in the standard deviation, which shows a greater homogeneity in their opinions.

In this study, great attention was paid to the process of categorizing and ordering the responses of the first round according to the degree of the agreement since the result of this process would be the starting point for the opinions of the second round [45]. The consideration of the experts' assessments and the understanding of their specific comments on the reagents contributed to a significant improvement in the quality of the reagents in terms of content.

The opportunities for approaching pedagogical practice in the teaching of courses in teacher education programs are one possible dimension to be measured by indicators and reagents. As the results of this study show, the expert panel validated the reagents as clear, consistent with the dimension, relevant in their measurement and sufficient to analyze the dimension thoroughly. The CATE project instruments have used similar indicators regarding the opportunities for PSTs to learn how to put into practice themselves the teaching practices taught in teacher training programs of this nature [21, 36, 37, 25]. The instrument presented in this study is a contribution to those already developed since it allows us to measure the opportunities for approaching pedagogical practice in the teaching of courses in a teacher education program, based on the revision of lesson plans developed by TEs.

Furthermore, it is possible to complement the aforementioned measurement of opportunities to approach pedagogical practice

in the teaching of the courses of the program, with the measurement of opportunities to approach pedagogical practice in the assessment of the courses of the program, based on different indicators and reagents. In this regard, it should be noted that the panel of experts validated the indicators and reagents associated with this dimension, in terms of their clarity, coherence and relevance, considering them also sufficient to measure it. This is a relevant contribution since the evaluation of learning practices by PSTs in PBTE is an area that requires empirical evidence to generate a more complete vision [3]. In this way, the instrument constitutes a valid tool for collecting integrated information on the presence of opportunities for PSTs to learn about the pedagogical practice from the teaching and assessment strategies used in the teacher education program.

7. Conclusion

The study allowed the development of an instrument that collects information on teaching and assessment strategies that TEs declare in their lesson plans in the context of a PBTE program, and which offer PSTs on-campus opportunities to approach pedagogical practices. The instrument was designed considering the evidence of the implementation of PBTE and the instruments that have been developed so far as to measure coherence and practice opportunities in this type of program.

The validation process of the instrument, based on a panel of experts in two rounds whilst applying the Delphi method, produced results that allow us to affirm that the Teaching and Assessment Strategies for Pedagogical Practice (TAPEP) instrument allow us to collect valid information on the teaching and assessment strategies of pedagogical practice that TEs declare in their lesson plans. A limitation of this study is the number of experts who analyzed and gave feedback on the effectiveness of the instrument. More experts would have increased the validity of this study´s findings. Despite the numerical limitation, the quality of the experts' opinion was high due to the rigorous selection criteria applied.

Future research could complement the information collected with data that may be reported by PSTs, class observations and the evidence of assessment processes. The instrument validated in this study focuses attention on the lesson plans, which correspond to the intentions of the teacher educators, which is not necessarily what happens.

Given that for PBTE no instrument allows for the revision of lesson plans in terms of teaching and assessment strategies for pedagogical practice in an integrated manner, this study contributes with a valid instrument. The revision of lesson plans is fundamental to access the adjustments that teacher trainers have been making and thereby monitor the scope and depth of the implementation of PBTE. Various teacher education programs, stakeholders, and those TEs who have initiated adjustments in their teaching will be able to apply this instrument.

REFERENCES

[1] Zeichner K, Peña-Sandoval C. 2015. Venture philanthropy and teacher education policy in the U.S.: The role of the new schools venture fund. Teachers College Record 117:1-44.

[2] Boyd DJ, Grossman PL, Lankford H, Loeb S, Wyckoff J. 2009. Teacher preparation and student achievement. Educational Evaluation and Policy Analysis 31:416-440.

[3] Matsumoto-Royo K, Ramírez-Montoya MS. Practice-based teacher education: a literature mapping over the past five years, p. In (ed),

[4] Peercy MM, Troyan FJ. 2017. Making transparent the challenges of developing a practice-based pedagogy of teacher education. Teaching and Teacher Education 61:26-36.

[5] DeMink-Carthew J, Grove R, Peterson M. 2017. The Influence of the Core Practices Movement on the Teaching and Perspectives of Novice Teacher Educators. Studying Teacher Education 13:87-104.

[6] Ramírez-Montoya M-S, Ramírez-Ramírez LN. 2018. El papel de las estrategias innovadoras en educación superior:retos en las sociedades del conocimiento.

[7] Darling-Hammond L, Newton X, Wei RC. 2010. Evaluating teacher education outcomes: A study of the Stanford Teacher Education Programme. Journal of Education for Teaching 36:369-388.

[8] Reisman A, Kavanagh SS, Monte-Sano C, Fogo B, McGrew SC, Cipparone P, Simmons E. 2018. Facilitating Whole-Class Discussions in History: A Framework for Preparing Teacher Candidates. Journal of Teacher Education 69:278-293.

[9] Neel MA. 2017. Making sense and facing tensions: an investigation of core practice complexities. Teaching Education 28:257-278.

[10] Boyd DJ, Grossman P, Lankford H, Loeb S, Michelli NM, Wyckoff J. 2006. Complex by design: Investigating pathways into teaching in New York City schools. Journal of teacher education 57:155-166.

[11] Corona CN, Montoya MSR. 2018. Mapeo sistemático de la literatura sobre evaluación docente (2013-2017). Educação e Pesquisa 44.

[12] Coggshall JG, Bivona L, Reschly DJ. 2012. Evaluating the Effectiveness of Teacher Preparation Programs for Support and Accountability. Research & Policy Brief. National Comprehensive Center for Teacher Quality.

[13] Darling-Hammond L. 2017. Teacher education around the world: What can we learn from international practice? European Journal of Teacher Education 40:291-309.

[14] Tiana A. 2013. Los cambios recientes en la formación inicial del profesorado en España: una reforma incompleta. Revista española de educación comparada:39-58.

[15] UNESCO, OREALC. 2014. Temas críticos para formular nuevas políticas docentes en América Latina y el Caribe: El debate actual. Centro de Estudios de Políticas Educativas. Universidad Católica Santiago, Chile.

[16] Montes N, Ziegler S. 2018. Los desafíos de la formación de los docentes del futuro. Entrevista a Cristian Cox Donoso. Propuesta educativa:57-60.

[17] Ball DL, Forzani FM. 2009. The work of teaching and the challenge for teacher education. Journal of Teacher Education 60:497-511.

[18] Grossman P, Hammerness K, McDonald M. 2009. Redefining teaching, re-imagining teacher education. Teachers and Teaching: theory and practice 15:273-289.

[19] Grossman P, Dean CGP, Kavanagh SS, Herrmann Z. 2019. Preparing teachers for project-based teaching. Phi Delta Kappan 100:43-48.

[20] Forzani FM. 2014. Understanding "core practices" and "practice-based" teacher education: Learning from the past. Journal of teacher education 65:357-368.

[21] DeGraff TL, Schmidt CM, Waddell JH. 2015. Field-based teacher education in literacy: preparing teachers in real classroom contexts. Teaching Education 26:366-382.

[22] Kloser M, Wilsey M, Madkins TC, Windschitl M. 2019. Connecting the dots: Secondary science teacher candidates' uptake of the core practice of facilitating sensemaking discussions from teacher education experiences. Teaching and Teacher Education 80:115-127.

[23] Hammerness K, Klette K. 2015. Indicators of quality in teacher education: Looking at features of teacher education from an international perspective. Promoting and sustaining a quality teaching workforce 27:239-277.

[24] Muller M, Álamos P, Meckes L, Sanyal A, Cox P. 2016. Teacher candidates' perceptions of opportunities to develop core practices in a teacher education program. Estudios Pedagogicos 42:145-163.

[25] Canrinus ET, Klette K, Hammerness K, Bergem OK. 2019. Opportunities to enact practice in campus courses: Taking a student perspective. Teachers and Teaching: Theory and Practice 25:110-124.

[26] Goh PSC, Yusuf Q. 2017. Validation of the Malaysian version of the teacher education program coherence questionnaire. Australian Journal of Teacher Education 42:42-59.

[27] Jenset IS, Klette K, Hammerness K. 2018. Grounding Teacher Education in Practice Around the World: An Examination of Teacher Education Coursework in Teacher Education Programs in Finland, Norway, and the United States. Journal of Teacher Education 69:184-197.

[28] Ball DL, Sleep L, Boerst TA, Bass H. 2009. Combining the development of practice and the practice of development in teacher education. Elementary School Journal 109:458-474.

[29] Gulikers J, Bastiaens T, Kirschner PA, Kester L. 2006. Relations between student perceptions of assessment authenticity, study approaches and learning outcome.

[30] Valdivia IMÁ. 2017. Evaluar para contribuir a la autorregulación del aprendizaje. Electronic Journal of Research in Education Psychology 7:1007-1030.

[31] López-Pastor VM, Pérez-Pueyo Á, Barba JJ, Lorente-Catalán E. 2016. Students' perceptions of a graduated scale used for self-assessment and peer-assessment of written work in pre-service physical education teacher education (PETE). Cultura, Ciencia y Deporte 11:37-50.

[32] García-Jiménez E. 2015. La evaluación del aprendizaje: de la retroalimentación a la autorregulación. El papel de las tecnologías. RELIEVE-Revista Electrónica de Investigación y Evaluación Educativa 21.

[33] Hattie J, Clarke S. 2018. Visible learning: Feedback.

[34] Shute VJ. 2008. Focus on formative feedback. Review of educational research 78:153-189.

[35] Mateo J. 2000. La evaluación educativa, su práctica y otras metáforas, vol 33. HORSORI EDITORIAL, SL.

[36] Oslo DoTEaSRUo. Coherence and Assignment study in Teacher Education (CATE). https://www.uv.uio.no/ils/english/research/projects/cate/. Accessed

[37] Research TP. Teacher politicy research. https://cepa.stanford.edu/tpr/overview. Accessed

[38] Hammerness K, Klette K, Bergem O. 2014. Coherence and assignments in teacher education: Teacher education survey. Oslo, Norway: University of Oslo Department of Teacher Education and School Research.

[39] Jenset I, Klette K, Hammerness K. 2014. Coding book: Teacher education observation protocol. Retrieved from Department of Teacher Education and School Research, University of Oslo, Oslo, Norway: http://www uv uio no/ils/english/research/projects/cate/Instruments.

[40] Jenset IS, Canrinus ET, Klette K, Hammerness K. 2018. Opportunities to analyse pupils' learning within coursework on campus: a remaining challenge in teacher education. European Journal of Teacher Education 41:360-376.

[41] López-Pastor V, Pérez-Pueyo Á, Barba JJ, Lorente-Catalán E. 2016. Students' perceptions of a graduated scale used for self-assessment and peer-assessment of written work in pre-service physical education teacher education (PETE). Cultura, Ciencia y Deporte 11:37-50.

[42] Coronado-Hijón A. 2015. Construcción de una lista de cotejo (checklist) de dificultades de aprendizaje del cálculo aritmético. Revista española de pedagogía:91-104.

[43] Dalkey N, Helmer O. 1963. An experimental application of the Delphi method to the use of experts. Management science 9:458-467.

[44] López-Gómez E. 2018. The Delphi method in current educational research: A theoretical and methodological review. EDUCACION XX1 21:17-40.

[45] Reguant Álvarez M, Torrado Fonseca M. 2016. El método Delphi. REIRE Revista d'Innovació i Recerca en Educació, 2016, vol 9, num 2, p 87-102.

[46] Steurer J. 2011. The Delphi method: an efficient procedure to generate knowledge. Skeletal radiology 40:959-961.

[47] García A, Ramírez-Montoya M, de León G, Aragón S. 2020. El emprendimiento social como una competencia transversal: construcción y validación de un instrumento de valoración en el contexo universitario. REVESCO Revista de Estudios Cooperativos.

[48] García-Peñalvo FJ. 2014. Formación en la sociedad del conocimiento, un programa de doctorado con una perspectiva interdisciplinar. Teoría de la Educación Educación y Cultura en la Sociedad de la Información 15:4-9.

[49] García-Holgado A, García-Peñalvo FJ, Ramírez-Montoya MS. Education in the knowledge society doctoral consortium, p 1083-1087. In (ed),

Conference Name: ACM TEEM conference